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Flood Forecasting and early warning: achievements and challenges

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Observed trends of increased economic losses associated with weather-climate extremes are in great part related to changes in societal behaviour and vulnerability, both in time and space. Risk awareness, increased preparedness and enhanced early warning systems are admitted to play a key role in reducing weather-related losses in vulnerable countries. Particularly, coupled meteo-hydrological forecasting systems are effective tools to achieve longer lead times in flood forecasting. To successfully develop such systems, interdisciplinary projects are crucial, as they can provide the basis for tracking uncertainty from atmospheric forcing to streamflow predictions. Uncertainty analysis can potentially add value to risk-based decision-making in flood warning, as well as in reservoir inflow forecasting, for users vulnerable to climatic and hydrological risks at different scales (e.g., electricity generation, agriculture and irrigation, navigation, public safety, etc.). Quantification and efficient communication of forecast uncertainty will result in an increased preparedness, whether the flood event happens or not, as users will be able to understand the message conveyed and act accordingly. However, the use of probabilistic forecasts in operational forecasting is not an easy task. This talk addresses some recent achievements in flood forecasting and remaining challenges to researchers, operational hydrologists and water managers.